1st

International Conference on Bio-Materials Science, Mechanical and Electrical Engineering (ICBMSM2E'24)

CONFERENCE PROGRAM SCHEDULE

December 11 - 12, 2024 | **NADOR, MOROCCO**

🌐 https://bmmee2024.sciencesconf.org
icbmsm2e2024@gmail.com

WELCOME MESSAGE

Dear Participants,

On behalf of the organizing committee, it is our great pleasure to welcome you to the **First International Conference on Bio-Materials Science, Mechanical, and Electrical Engineering (ICBMSM2E'24)**. This prestigious event will be held from December 11-12, 2024, in the vibrant City of Trades and Skills, Nador, Morocco.

ICBMSM2E'24 is jointly organized by the High School of Technology (EST) in Nador, the Faculty of Sciences in El Jadida, Chouaib Doukkali University (UCD) in El Jadida, and Mohammed First University (UMP) in Oujda. Together, we aim to provide a dynamic platform for global scholars, experts, and industry leaders to share innovative research and explore the future frontiers in Bio-Materials Science, Mechatronics, Artificial Intelligence, and Renewable Energy Engineering.

This conference is not just a celebration of academic excellence but also a significant opportunity to build lasting connections, foster multidisciplinary collaborations, and ignite meaningful discussions. We are honored to host you in a setting that blends intellectual inspiration with the natural beauty of Nador.

We are delighted by your participation and look forward to engaging presentations, insightful dialogues, and vibrant exchanges. Thank you for contributing to the success of **ICBMSM2E'24**, and we hope you have a memorable experience in Morocco.

Warm regards,
The Organizing Committee
ICBMSM2E'24

The First International Conference on Bio-Materials Science, Mechanical and Electrical Engineering (ICBMSM2E'24)

Day 1 – Wednesday December 11, 2024

08:00 - 09:00	**Registration** **"City of Trades and Skills"**	
09:00 - 09:30	**Opening Ceremony**	
	Honorary Chairs General Chairs	
09:30 - 10:15	**PLENARY CONFERENCE 1** **Mr. Gabe GABRIELLE** (Former NASA Engineer, USA) « To infinity and beyond »	
10:15 - 11:00	**PLENARY CONFERENCE 2** **Pr. Mohamed ESSAIDI** (Founding President of the IEEE Morocco Section Morocco) « *Smart Cities, Smarter Futures: Accelerating UN SDGs Through Innovation* »	
Moderator: Pr. M. Louzazni		

Coffee Break / Poster session 1 (11:00 – 11:30)

Oral sessions 1 **(Parallel Sessions)** **11:30 - 13:00**	
Room 1: *Advances in Biomaterials, Environmental Engineering, and Renewable Energy Technologies*	
Moderator: Pr. K. Essifi	
Development of calcium phosphate cements as potential drug delivery systems of ciprofloxacin: Effect of additives on the functional properties, drug delivery, and antibacterial efficiency **Hanaa Mabroum**, Hamza Elbaza, Hicham Benyoucef, Hassane Oudadesse, Hassan Noukrati, Allal Barroug	**ID45**

Innovative Approaches: mHealth Applications and AI in Managing Salt Intake for Hypertension **Sara Ramdani**, Nour El Houda Benkaddour, and Intissar Haddiya	**ID87**
Multifunctional doped bioactive glasses for bone tissue regeneration: characterization, bioactivity, and antioxidant assessment **Zakaria Tabia**, Allal Barroug, and Hassan Noukrati	**ID95**
Low Gain Avalanche Detector for monitoring flash radiotherapy beam: A TCAD & Monte Carlo Simulation study **Fatima Zahra Rimchi**, Abdelilah Moussa	**ID27**
Contaminants in Soil-Like Material Recovered from the Rehabilitated Landfill of Oujda-Sidi Yahya (Eastern Morocco): A Case Study **Malki Nadia**, Sbaa Mohamed, Arabi Mourad, Slamini Maryam, Kajeiou Hamza	**ID65**
Adaptive Forecasting of Photovoltaic Energy Generation Using LSTM Technique **Meryem Yahyaoui**, Mohamed Karom, Hajar Chadli, Khalid Salmi, Mohammed Saber, Sara Chadli	**ID57**
Room 2: Advances in Mechanical Engineering and Electronic Systems: Innovations and Applications	
Moderators: Pr. M. Lahlou; Pr. C. Hajjaj	
Evaluation of the Seismic Response of RC Buildings considering different heights, uplifting, soil properties and seismicity of area **Nadia El Abbas**, Khamlichi Abdellatif and Mohammed Bezzazi	**ID122**
A finite volume method for coupled models of suspended and bed-load transport in shallow water flows **Mohammed Frihessane**, Ouafae Boulerhcha, Salah Daoudi	**ID25**
Investigation of the magnetized dusty plasma sheath in the presence of nonextensive electrons and two species of positive ions **Eljabiri Zakariae**, El Ghani Omar, Driouch Ismael	**ID15**
Numerical modeling of the propagation of a reflective crack within the asphalt layers of a pavement under traffic **Ayoub M'chich**, Khalid Nasri	**ID98**
Parametric study of mat-foundation system under dynamic seismic loading accounting local uplift, soil behavior and magnitude of rotation **Nadia El Abbas**, Khamlichi Abdellatif and Mohammed Bezzazi	**ID105**
Monte Carlo simulation of the magnetic properties of a multilayer mixed-spin system (5/2, 3/2) **H. Saadi**, A. Al-Rajhi, E.M. Jalal, and M. El Bouziani	**ID159**
Aerosol radiative forcing around the Mediterranean **Rajae Meziane**, Mohammed Diouri, Abdelmoula. Ben-Tayeb	**ID218**

Room 3: Mathematical Modeling and Informatics Applications	
Moderator: Pr. A. Toukmati	
Fintech and Blockchain in Morocco: A Systematic Literature Review **Issaili Oumaima**, Sedqui Abdelfettah	**ID33**
Solving Kortweg-de Vries Equation using finite difference scheme **Mustapha Bassour**	**ID108**
Existence of solutions for a nonlinear parabolic problem **A. Bousgheiri**, A. Ourraoui	**ID19**
Hybrid CNN-BiLSTM-Attention Models for Accurate Remaining Useful Life Prediction in Turbofan Engines **Abdelhafid Ayaou**, Fouad Elotmani, and Mohamed Atounti	**ID28**
Maximum Matching in Fractal Trees and Sierpiński Carpet Using Python **Dahmani Abdelkarim**, Kaoutar Lamrini Uahabi, Siham El Habib	**ID37**
Truck Position Prediction in Port Terminals Using Temporal Convolutional Networks **El Karkraoui Mohammed**, Attariuas Hicham	**ID58**

Lunch (13:00 – 15:00)

15:00 - 15:45	**PLENARY CONFERENCE 3** **Pr. Daniel Tudor Cotfas** (Transylvania University of Brașov, Romania) *« Advancements and challenges in hybrid systems for renewable energy »*
Moderator: Pr. C. Hajjaj	
Oral sessions 2 **(Parallel Sessions)** **15:45 - 17:45**	
Room 1: *Advances in Biomaterials, Environmental Engineering, and Renewable Energy Technologies*	
Moderator: Pr. F. Dimane	
Detailed Thermal Characterization and Experimental Verification of 2D Temperature Distributions in Photovoltaic Modules **A. Kadyri**, Em. Assaid, K. Kandoussi, O. Souhar	**ID41**

Reliability Analysis of Unstabilized Rammed Earth: The effect of Lateral Wind Pressure **Salhi Chaymae**, El Mkhalet Mouna, Lamdouar Nouzha	**ID42**
Secondary fragmentation of carbon ion beams in a water phantom: Monte Carlo simulation with TOPAS **Ikram Habib Allah**, Ayoub Marhou, Mohammed Hamal, Noureddine Chafi	**ID23**
A Digital Twin framework for a Smart Sustainable City **Miraoui Zayneb**, Nasser Abdelkader, Mohcine Kodad	**ID73**
Design of Phosphate-based Biocomposites for Local Delivery of Bioactive Molecules in Bony Tissues **Houda Moukadiri**, Hassan Noukrati, Hicham Ben Youcef, Allal Barroug	**ID14**
Biopolymer-Integrated Amorphous Calcium Phosphate for Bone Grafts: An In Situ Functionalization Approach **Hamza Elbaza**, Hanaa Mabrouma , Hicham Ben Youcef , Allal Barroug, Hassan Noukrati	**ID35**
Comparison of the performance of a photovoltaic thermal system cooled by water and by air: a three-dimensional numerical analysis **Yassine El Alami**, Bouchaib Zohal, Said Bounouar,, Elhadi Baghaz	**ID85**
Room 2: **Advances in Mechanical Engineering and Electronic Systems: Innovations and Applications**	
Moderators: Pr. F. Majid; Pr. E. Baghaz	
Enhancing Monte Carlo Simulation Efficiency in Radiotherapy through Feedforward and Inverse Neural Networks **Sennan Nour-Eddine**, El Hamli Abdelkader, Abdelilah Moussa	**ID1**
Computational Fluid Dynamics Analysis of Internal Cooling Techniques in Aeronautical Gas Turbines **Kamal Abouelmajd**, Ismail Lagrat, Salim Zahid, Assel Thami Lahlou and Hamid Mounir	**ID13**
Impact of Electric Vehicle Integration on the Moroccan Power Grid by 2050: A Scenario-Based Analysis **Mouad Karmoun**, Aboubekr Allam, Smail Zouggar, Hassan Zahboune, Mohamed Elhafyani, Taoufik Ouchbel, Wafae Arfaoui, And Mohammed Elfahssi	**ID20**
Study of the Mechanical Properties of Mortars: A Study Using Destructive and Non-Destructive Methods **El Ballouti Abeslam**, Tahri Zakaria	**ID46**
Modeling and Experimental Analysis of Non-Fickean Water Desorption in Elastic and Deformable Couscous Grains **H. Bagar**, F. Ait Hmazi, I. Mrani, A. El Afif	**ID204**

Topological Interface States in photonic multilayered structure based on bandgap inversion symmetry Noura Ezzahni, Mohammed El Aouni, Soufyane Khattou, **Afaf Bouzidi**, Madiha Amrani, El Houssaine El Boudouti	**ID50**
Towards an optimized braking system using topology optimization, thermal and durability analysis **M. H. Aniyou**, H. Fihri-Fassi	**ID54**
TBeam propagation and parametric characterization of vortex higher-order cosine-hyperbolic-Gaussian beams in free space **A. Ahlane**, Z. Hricha, A. Belafhal	**ID63**
Room 3: Mathematical Modeling and Informatics Applications	
Moderator: Pr. M. El Bojaddaini	
An Ultra-Compact Wideband Low-Pass Filter Using a Multi-Objective Genetic Algorithm **Khadija Abouhssous**, Asmaa Zugari, Moustapha El Bakkali and Alia Zakriti	**ID11**
Comparison between Trajectory Planning Algorithms for Mobile Robots **Touzani Kawtha**r, Youssefi Abdelkader	**ID43**
Characteristics Analysis of a Negative Permittivity Metamaterial Transmission Line Equivalent to a Microwave Circuit **Hamdaoui Ikram**, El-Aouni Mimoun, Ben-Ali Youssef, Ghadban Amina, Bria Driss	**ID48**
Ephemeral Diffie-Hellman Key Exchange: An Innovative Approach for IoT **El Ouafi Mohamed**, Kaoutar Lamrini Uahabi, Aslimani Abderrahim	**ID49**
Antenna design and characterization for 6G technology **Abdeddaim Rguibi**, Asmaa Zugari	**ID55**
Study and development of multi-band fractal triangular patch antenna for WLAN application **Safae Dou-Allal**, Ahmed Faize, Soufian Lkrit	**ID68**
Design and EM Simulation of a Wideband 10 W Class F GaN Power Amplifier **Fouad Zazd**i, Said El Khaldi, and Taj-Eddin Elhamadi	**ID115**
New Approach to Study the Motion of Free-Falling Objects Using Arduino and Computer **R Essaadaoui**, M El Hadi, A Ouariach, A Hachmi, A El Moussaouy, K Laabidi	**ID96**
Coffee Break (17:45 – 18:00)	

The First International Conference on Bio-Materials Science, Mechanical and Electrical Engineering (ICBMSM2E'24)

Day 2– Thursday December 12, 2024

09:00 - 09:30	**Registration** **"City of Trades and Skills"**
09:30 - 10:15	**PLENARY CONFERENCE 3** **Pr. Petru Adrian COTFAS** (Transilvania University of Brasov, Brasov, Romania) *« Characterization of solar thermoelectric generator based on RIO hardware »*
	Moderator: Pr. A. El Guerraf

Coffee Break / Poster session 2 (10:15 – 10:45)

Oral sessions 3
(Parallel Sessions)
10:45 - 13:00

Room 1: *Advances in Biomaterials, Environmental Engineering, and Renewable Energy Technologies*

Moderator: Pr. P. A. COTFAS

Performance and degradation assessment of various PV modules exposed outdoors for the short term in two distinct climatic zones in the USA **Y. Bouasria**, M. Zaimi and E. M. Assaid	**ID225**
Physicochemical and radiological assessment of phosphogypsum effluents from phosphoric acid production: Environmental impact on Morocco's El Jadida coastal province **Fatima Ezzahra Arhouni**, Saad Ouakkas, Maged Ahmed Saleh Abdo, Mohamed Elhadi Bouhssa, Aziz Boukhair	**ID231**
Optimizing CdS Thin Films as Transparent Window Layers in Solar Cells A. El Hassani, L. Limouny, Y. El Hassouani and **S. Dlimi**	**ID136**

Assessing the seawater quality of a coastal city using fecal indicators and environmental variables (East Mediterranean Coast Moroccan) **Hamza Ngadi**, Mostafa Layachi, Ghizlane Azizi, Sara Esseffar, Yassine El Yousfi, Hicham Gueddari, Hamza Loukili, Abderrahmane Rahhou, Chahban Mohamed, Abdelmajid Moumen	**ID144**
Low-grade phosphate ore from Benguerir mine: characterization and application for the desulfation of industrial phosphoric acid **Jihad El Makaoui**, Abderrahim Najah Elidrissi, Younes Chaali, Mohammed Dahbi, Abdessalam Bouddouch, Abderrahmane Aboulhassane, Driss Zakaria	**ID207**
Pistacia Lentiscus Leaf Extract: Investigating the Antioxidant Potential of its Primary Constituents through Experimental and Computational Analysis **Hamza Bouakline**, Imane Ziani, Mohammed Elkabous, Yasser Karzazi, Abdesselam Tahani, Ali El Bachiri	**ID165**
Metal-organic frameworks for enhanced hydrogen production: A pathway to sustainable energy **Abdelqader El Guerraf,** Kamal Essifi, Meriyem Mouloudi, Ghulam Abbas, Mohammed Bazzaoui and El Arbi Bazzaoui	**ID7**
Recent Advances in Alginate-Montmorillonite Biomaterials for Fertilizer Encapsulation and Controlled Nutrient Release: A Comprehensive Review **Abdelghani LAAMAOUI**, Kamal ESSIFI, Hanan EL ALAOUI-BELGHITI	**ID201**
Room 2: **Advances in Mechanical Engineering and Electronic Systems: Innovations and Applications**	
Moderator: Pr. M. Louzazni	
Design of a Multiband Pattern Reconfigurable Antenna for 5G MillimeterWave Frequency Applications Rafik Er-Rida, **Chakib Taybi**, Bachir Elmagroud, Meryem Bekkouch and Khalid El Youssfi	**ID184**
Numerical Study of Sheath Formation and Characteristics in a Magnetized Non-Extensive Plasma with Secondary Electron Emission **Zakariyae El Ankouri**, Mohamed El Bojaddaini, Morad El Kaouini, Hassan Chateii	**ID186**
Optimization of Energy Consumption in the PET Bottle Blowing Process **Lotfi Sehli**, Yousra Elkihel, El Mahdi Bouyahrouzi, Bachir Elkihel	**ID128**
Mechanical behaviour and failure mechanisms of conductive PLA: Influence of crosshead speed **Nassima Naboulsi**, Fatima Majid, And Taoufik Hachimi	**ID90**

Estimation of rebar diameter using GPR data **Hamdaoui Mohammed**, Tahar Bachiri, Bendaoued Mohammed, Lakrit Soufian, Faize Ahmed, Elhadi Baghaz, Sara Said	**ID170**
Investigation of Radio Frequency Sheath Structure in Electronegative Plasma with Cairns–Tsallis Electron Distribution **Mohamed Bouzraa**, Abdelhak Missaoui, Morad El Kaouini, Mohamed El Bojaddaini, Hassan Chatei	**ID195**
Qualitative Evaluation of the Error of the Near-Field Measurement Probe at 5G Frequencies of Mobile Networks Rafik Er-Rida, **Chakib Taybi**, Abdechafik Derkaoui, Bachir Elmagroud, Mohammed Anisse Moutaouekkil and Chaieb Elbekkaye	**ID208**
Development of a Dynamic Energy Management and Maintenance System for Thermal Systems Based on New Technologies: A Case Study on a Boiler **Bouyahrouzi El Mahdi**, El Kihel Ali, Sehli Lotfi, Berquedich Mouna	**ID126**
Impact of Manufacturing Execution Systems on Maintenance in the context of Industry 4.0: Case study **Lotfi Sehli**, Ali Elkihel, Soufiane Embarki, Bachir Elkihel	**ID129**
Room 3: Mathematical Modeling and Informatics Applications	
Moderator: Pr. E. BPr. A. Baghaz	
Characterizing Temperature Distribution in Bifacial PV Modules Using Integrated Heating, Absorption Analysis, and Numerical Techniques Khadija Ibaararen, Mhammed Zaimi, Khadija El Ainaoui, and **El Mahdi Assaid**	**ID80**
Optimizing Parameter Selection in Fuzzy Neural Network for Enhanced Pattern Recognition Using Evolution Strategy **O. El Melhaoui**, S. Said, Y. Guetbach	**ID142**
Simultaneous Optimization of CNN and KNN Parameters using Genetic Algorithms for Enhanced Shape Recognition **O. El Melhaoui,** S. Said, Y. Guetbach	**ID214**
Transformation of GED functionalities from the CIM to the PIM via the QVT code Soufiane Hakkou, Redouane Esbai, Lamlili El Mazoui Nadori Yasser	**ID39**
GPR for rebar radius estimation in concrete Hamdaoui Mohammed, Tahar Bachiri, Bendaoued Mohammed, Lakrit Soufian and **Faize Ahmed**	**ID135**

Quantum State Engineering in Two-Spin Systems under Governed by a 3X Heisenberg Model **Brahim Amghar**, Mohammed Daoud, Said Dlimi	**ID143**
Modeling the Moroccan Transmission Network: Data Collection and Simulation **Wafae Arfaoui**, Mouad Karmoun, Khaoula Azzakhnini, Mohamed Larbi Elhafyani, Smail Zouggar, Hassan Zahboune, T. Ouchbel, Adrian Alarcon Becerra, And Nikola Matak	**ID188**
Application of Neural Networks for the Optimization of a Discrete Probabilistic Model of a Physical Quantity Degradable by a Continuous Model **Imad El Adraoui**, **Youssef Jabari**, Brahim Moudoud, Hassan Gziri	**ID130**
Application of Neural Networks for the Optimization of a Discrete Probabilistic Model of a Physical Quantity Degradable by a Continuous Model Imad El Adraoui, **Youssef Jabari**, Brahim Moudoud, Hassan Gziri	**ID125**
Exploring the Use of ChatGPT in Event Extraction: Review of Methods and Domain-Specific Enhancements **Mohamed TAYYAUI**, Anass ELHADDADI, TARIK BOUDAA	**ID235**

Lunch (13:00 – 15:00)

Oral sessions 4 **(Parallel Sessions)** **15:00 - 17:15**
Room 1: Advances in Biomaterials, Environmental Engineering, and Renewable Energy Technologies
Moderator: Pr. S. Laasri

Comprehensive Investigation of Neutral, Cationic and Anionic Dye Removal Using Bio-Based Alginate@MMT Hybrid Microcapsules: Assessing the Superiority of Encapsulation over Conventional Adsorption Techniques **Essifi Kamal**, Mohamed Brahmi, Abdelqader El Guerraf, Hassan Charii, Abdelghani Boussetta, Abdelouahab El Hadrami, Rachid Brahmi, Amine Moubarik, Abdesselam Tahani	**ID76**
Advances in controlled-release fertilizer encapsulated by Alginate-Biochar-Based Biomaterials **Abdelghani LAAMAOUI**, Kamal ESSIFI, Hanan EL ALAOUI-BELGHITI	**ID34**

Passive Optimization of Solar PV Intermittency for Industrial Applications **Mouhssine Rami**, Charaf Hajjaj ,Baghaz Elhadi, Samira Touhtouh, Abdelowahed Hajjaji	**ID220**
Optimization of Industrial Processes Through Digital Twin Solutions: Modeling, Monitoring, and Decision Making, Application to a Water Filtration Unit **Soufiane EMBARKI**, Yousra EL KIHEL, Bachir EL KIHEL	**ID229**
Room 2: Advances in Mechanical Engineering and Electronic Systems: Innovations and Applications	
Moderator: Pr. A. Laazizi	
Discharge Frequency-Dependent Plasma Reflectors in Antenna Design: Modeling and Simulation for Enhanced Gain and Directivity **Ayoub Eljaouhari**, Abdelhak Missaoui, Majid Rochdi, Morad El Kaouini	**ID192**
Utilizing Complementary Split-Ring Resonators for Effective Mutual Coupling Mitigation in Eight-Element Antenna Arrays **Sara Said**, Yassmina Guetbach, El Melhaoui Ouafae, Abdenacer Es-Salhi, Ahmed Faize, Baghaz Elhadi	**ID166**
Miniaturization of Antennas Using Metamaterial Techniques for Next-Generation Wireless Applications **Sara Said**, Hamdaoui Mohammed, Abdenaceres-Salhi, Ahmed Faize, Baghazelhadi	**ID213**
Damage and durability assessment of 3D printed materials: Effect of crack length, and orientation on structural integrity **Taoufik Hachimi,** Fatima Majid, Fouad Ait hmazi, Nassima Naboulsi, and Ibrahim Mrani	**ID160**
Study of the Seismic Performance of Construction Using Local Materials **Adil Hazzaz**, Taoufik Tbatou	**ID60**
Introducing Robotics in High School: A Case Study with Low-Cost and 3DPrinted Robots **Mohammed El Miri**, Said El Khaldi, Ismael Driouch, Moustapha El Bakkali, Loukmane El Khaldi	**ID70**
Effects of Rashba Spin-Orbit Interaction on Quantum Entanglement and Coherence Between Non-Interacting Electrons **Chaimae Banouni**, Mostafa Mansour, Mohamed Ouchrif	**ID169**
Experimental study on failed reverse osmosis membrane at the end of life stage **Fadwa Jouali**, Fatima Majid	**ID153**

Fluid Dynamics and Electromagnetic Interactions in Radiofrequency Discharges: Insights for Enhanced Plasma Processing **Yassmina Guetbach**, Sara Said, Meryem Grari, El Melhaoui Ouafae, Cifallah Zoheir	**ID215**

Coffee Break (17:15 – 17:45)

Closing Ceremony **17:45 – 19:00**

Honoring Keynote Speakers **Best Oral Presentation and Best Poster Award** **Delivery of participation certificates**

Poster sessions

Session 1	
Energy performance of building walls incorporating PCMs **Toumzine Soukaina**, Moulay Abdelali Hanane	**ID17**
Literature review on the reinforcement of self-compacting concrete by plant fibers **Maryem Bali**, Hanane Moulay Abdelali, Toufik Cherradi	**ID22**
Perception and knowledge of organic food among the Moroccan population **Soumaya Atouife**, Abdelghani Aboukhalaf, Jamila Elbiyad, Seloua Essaih, Kaoutar Naciri, Adil Kalili, Abdellah El Habazi, And Rekia Belahsen	**ID106**
Study of the dynamics of seagrass Cymodocea nodosa in Al Hoceima Marine Protected Area **Karim Souhail**	**ID109**
Synthesis and Characterization of CuO Thin Films on Glass, ITO, and FTO Substrates Using Spin-Coating for Photovoltaic Applications **Nouhaila Benaissa**, Taoufik Garmim, Zouhair El Jouad, Ahmad Louardi, Mohamed Monkade	**ID185**
The agro-food industry valorization of Cannabis **Hajar Soujaa,** Chaymae El Youssfi, Ouafae Zerrad, Mohammed Rami, Saida Aarab, Mohammed Hassani Zerrouk	**ID200**

Poster sessions

Session 2	
One pot synthesis of polyaniline–silver nanocomposites on cellulosic fibres for active food packaging **Abdelqader El Guerraf**, Sana Ben Jadi, Imane Ziani, Abdellah Ech-chahad, Farooq Sher, Mohammed Bazzaoui and El Arbi Bazzaoui	**ID101**
Advanced applications of metal-organic frameworks: Green hydrogen production, energy storage, and environmental remediation for sustainable development **Essifi Kamal**, Abdelqader El Guerraf, Mohamed Brahmi, Abdelouahab El Hadrami, Rachid Brahmi, Amine Moubarik, Abdesselam Tahani	**ID117**
AI-Driven Bridge Rehabilitation: Enhancing Infrastructure through Predictive Analytics **Salma Ouhmida**, Hanane Moulay Abdelali	**ID9**
Metasurface-Enhanced Reconfiguration of MIMO Antenna Radiation Patterns for 5G Millimeter-Wave Applications **Youssef El Maimouni**, Saida Ahyoud, Abdelmoumen Kaabal	**ID92**
The impact assessment of a magnetic field dedicated to MRI during a carbon-therapy on treatment efficiency **Ayoub Marhou**, Mohammed Hamal, Abdelkarim Bazza, And Mustapha Zerfaoui	**ID112**
Neotectonic structures of the north central rif (Morocco): Contribution of digital Mapping data **Achraf Moqaddem**, Mohamed Makkaoui, Omar Azzouz	**ID226**
Modeling Proton Ionization Cross Sections for DNA Bases: Insights for Radiation Therapy Optimization **M. L BOUHSSA**, F. ARHOUNI, S. OUAKKAS, N. HARAKAT, A. BOUKHAIR	**ID139**

CONFERENCE VENUE

The City of Trades and Skills

https://maps.app.goo.gl/tPDdMWTPYiYrh46z7

Welcome to Nador, Morocco